

PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in or relating to Granular Products and Method of Manufacture Thereof

We, SVENSKA AKTIEBOLAGET GASACCUMULATOR, of Stockholm-Lidingö Sweden, a Swedish Company, do hereby declare the nature of the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to granular products containing grains of hard material held together by a metallic bonding medium, and to a method of manufacturing such products, the invention being applicable to sintered products, such as of the hard metal type, in which grains of tungsten carbide are embedded in cobalt. The invention is particularly applicable to grinding elements having surfaces containing abrasives.

In the manufacture of products having grains embedded in a bonding medium, it is often difficult, when the bonding medium is a metal, to attain satisfactory adhesion between the grains and the bonding medium.

It is previously known to coat the grains of a granular product with iron before the grains are embedded in the bonding medium. However, this method has the disadvantage that a chemical reaction may take place between the iron and the grains.

The present invention has for its object to provide an improved method of manufacturing granular products whereby this disadvantage is removed.

According to the present invention, granular products of the kind referred to, in which grains of a hard material are embedded in a metallic bonding medium, are manufactured by a method which is characterised in that there is applied to the grains prior to their embedding in the bonding medium, first, a baselayer of a platinum group metal, preferably palladium, and, second, a coat of iron, cobalt or nickel. Preferably the coating metal is of greater hardness than the metallic bonding medium, which does not

come into contact with the grains but, instead, with the metallic coating thereof, the coating on the grains being capable of adhering strongly to the bonding medium, for instance, by fusion.

The depth of the coating may vary from comparatively large values relative to the diameter of the molecules thereof to small values, but preferably the depth of the coating corresponds to about ten times the diameter of the molecules.

The bonding medium may be of nickel, iron, cobalt or copper. Preferably the bonding medium is softer than the coating metal and for this purpose may consist of a metal produced by an electrolytic process and free from occluded hydrogen. The bonding medium may be applied to a disc or supporting element by sintering, fusion or galvanically.

The coating of the grains may be effected by exposing them at a high temperature to the carbonyl of the coating metal.

The invention includes the granular products produced by the method hereinbefore defined.

In carrying the invention into effect according to one embodiment as applied to the manufacture of a grinding element, abrasive grains of any suitable kind, such as carborundum, diamond, boron carbide, tungsten carbide, or aluminium oxide in crystalline or non-crystalline form, are coated with the desired base-layer and coating metal. If it is assumed that the coating is to consist of nickel, the grains are first coated with a base layer comprising a metal of the platinum group, such as palladium. The application of this base layer may be effected by preliminary treatment with a stannous chloride (SnCl_2) solution followed by rinsing and treatment with a solution containing the base layer metal, followed by treatment with, a solution containing the desired coating metal, e.g., nickel. If it is desired to alloy

phosphorus with the nickel, this may be achieved in a simple manner by adding a reducing phosphorus composition whereby the metal precipitated from the solution will contain some phosphorus.

The carbonyl of the desired coating metal may be used for producing the coating. For instance, the grains heated to 100 to 130°C. may be allowed to fall through a chamber containing gaseous nickel carbonyl.

The coated grains are embedded in the metallic bonding medium in any well-known manner as by sintering, fusion or galvanically.

Usually, the bonding medium is supported by and attached to an element, such as a metal disc. If a grinding element is to be built up on such a disc, the molten medium may be applied to the disc, whereupon the grains are distributed into the medium which is then allowed to cool.

By sand blasting or polishing, or in any other suitable way, the superficial layers of the bonding medium and coating are removed so that sharp edges of the grains will be exposed.

Alternatively, a galvanic process may be employed, the disc being made the cathode in an electrolytic bath and after the grains have been distributed on to the disc the bonding medium is precipitated on the disc electrolytically so that the grains become embedded.

What we claim is:—

1. Method for the manufacture of granular products in which grains of a hard material are embedded in a metallic bonding medium, which is characterised in that there is applied to the grains, prior to their embedding in the bonding medium, first, a base layer of a platinum group metal, and second a coating, of iron, cobalt or nickel.

2. Method according to Claim 1 wherein the base layer is palladium.

3. Method according to Claim 1 or 2, wherein the coating metal is of greater hardness than the metallic bonding medium.

4. Method according to any of the preceding claims, where in the depth of the coating is about ten times the diameter of the molecules.

5. Method according to any of the preceding claims, wherein the bonding medium is of nickel, iron, cobalt or copper.

6. Method according to any of the preceding claims, wherein the bonding medium is softer than the coating metal and for this purpose consists of a metal produced by an electrolytic process and free from occluded hydrogen.

7. Method according to any of the preceding claims, wherein the bonding medium is applied to a disc or supporting element by sintering, fusion or galvanically.

8. Method according to any of the preceding claims, wherein the coating of the grains is effected by exposing them at a high temperature to the carbonyl of the coating metal.

9. Method for the manufacture of granular products in which grains of a hard material are embedded in a metallic bonding medium, substantially as hereinbefore described.

10. A granular product containing grains of hard material, such as diamond, held together by a metallic bonding medium produced by the method claimed in any of the preceding claims.

Dated this 30th day of November, 1951.

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